

sugar being present in an amount of from about 3g/l to about 7g/l.

81. The process of Claim 80 wherein said TGF- β 3 is present in said medium in an amount of at least 5 ng/ml.

82. The process of Claim 81 wherein said TGF- β 3 is present in said medium in an amount of from 5 ng/ml to 15 ng/ml.

83. The process of Claim 80 wherein said mesenchymal stem cells are isolated, culture-expanded human mesenchymal stem cells.

DI 84. The process of Claim 80 wherein the mesenchymal stem cells are condensed into close proximity.

85. The process of Claim 84 wherein the mesenchymal stem cells are present as packed cells or a centrifugal cell pellet.

86. The process of Claim 80, and further comprising placing said cells in a rigid porous vessel.

87. The process of Claim 86 wherein said rigid porous vessel is a ceramic cube.

88. The process of Claim 80 wherein said simple sugar is glucose.

89. The process of Claim 88 wherein said glucose is present in said serum-free medium in an amount of about 4.5 grams per liter.

90. A process of inducing chondrogenesis in mesenchymal stem cells by culturing mesenchymal stem cells in a chemically defined serum-free medium *in vitro* wherein the mesenchymal stem cells are associated in a three-dimensional format, and wherein said chemically-defined serum-free medium comprises (1) a chemically defined minimum essential medium; (2) ascorbate or an analog thereof; (3) an iron source; (4) insulin or an insulin-like growth factor; (5) at least one chondroinductive agent or factor, wherein said at least one chondroinductive agent or factor is TGF- β 3; and (6) a simple sugar, said simple sugar being present in an amount of from about 3g/l to about 7g/l.

91. The process of Claim 90 wherein said mesenchymal stem cells are isolated, culture expanded human mesenchymal stem cells.

92. The process of Claim 90 wherein the mesenchymal stem cells are condensed into close proximity.

93. The process of Claim 92 wherein the mesenchymal stem cells are present as packed cells or a centrifugal cell pellet.

94. The process of Claim 90 wherein said TGF- β 3 is present in said medium in an amount of at least 5 ng/ml.

95. The process of Claim 94 wherein said TGF- β 3 is present in said medium in an amount of from 5 ng/ml to 15 ng/ml.

96. The method of Claim 90, and further comprising placing said cells in a rigid porous vessel.